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## NURSES' WORK IN MILK STATIONS

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IN 1882 the city of Rochester, N. Y., with a United States census of eighty-five thousand people, had six hundred and ninety deaths under five years of age, or 37.5 per cent. of the total deaths from all causes during that year. In 1892, ten years later, there were nine hundred and sixty-eight deaths in children under five years of age, or 36.5 per cent. of the mortality from all causes for that year. Between these periods the deaths had varied, the yearly average of the death-rate under five years of age being a little under thirty-five per cent. for the ten-year period. As Kipling says, "the earth spawned humanity as it bred frogs in the rains, and the gap of sickness and death of one season was filled to overflowing by the fecundity of the next."

In the sixteen years between 1881 and 1896, in this city with an average population of one hundred and twelve thousand people, eleven thousand five hundred and thirty-eight children under five years of age died of various infantile diseases. The percentage of infantile mortality during that period was more than thirty-three per cent. of the deaths from all causes. Think of it! More than one-third of all the deaths during sixteen years occurred in children under five years of age. What was the cause of all these deaths? Why were there each year so many deaths among little children? Was our city the exception? No, the numerous infantile deaths in other cities prove that elsewhere—in cities big with population and in those of small numbers—the babies died quite as numerously and in some places more frequently than in our own city.

The main reason for all these deaths is not difficult to find. Of course, the stuffy air of living- and sleeping-rooms, the ill-cared-for

bodies, the lack of water both within and without the body, among other things, are somewhat responsible for these deaths. But these and any other causes for this great mortality, for the numbers of ill-developed children who grow to maturity, all pale into insignificance before the main cause, the dirty milk supply of our cities. If a child is brought up as it should be by its mother, under the guidance of a physician who will insist that no other way but the nature-given way is at all to be considered in feeding her child, then her child will escape the greatest dangers to which it can be subjected during its first months and years of infant life. But if, instead of the duties to her child, the duties of society are allowed to come before the maternal duties, then the child must be exposed to dirty milk, the greatest danger of its early life period.

Smallpox may be protected against by vaccination, diphtheria by antitoxin, other contagious diseases by isolation and quarantine, but no virus of cleanliness has yet been discovered with which to inoculate the duty of cleanliness into the milk farmer and the milkman, so that the milk supply of people of average means may be clean at its source and through its various channels of distribution. Most household commodities may be washed,—meat, vegetables, even shell-fish,—but no process of washing can clean milk once it has been fouled by dirt from the barnyard and other sources. Of course, people will tell you that the doctor says, “Better sterilize or Pasteurize the milk.” Look at such a proposition from all points, and then decide whether you would advise a mother to feed the dirty milk of commerce treated in this way to her own child, and when you have so decided, let your decision be upon this basis and upon this basis alone: would you knowingly feed such a mixture to your own child? If milk is clean, it needs no such process to clean it; if dirty, the danger is only minimized by Pasteurizing or sterilizing.

The chief source of much of our milk supply is from the barn of the small farmer in the country. His barn is more often badly drained than not. Cobwebs usually festoon the walls and sides of the cow-house. The water supply is such that it does not enable him to properly clean his milk-cans and other utensils. Not infrequently his cattle are fed on insufficient food and food of poor quality. Not a small percentage of the cattle are in low health, and not a few of them are affected by tuberculosis. The man who cares for the cattle, milks them, cleans the cans and utensils, and distributes the milk has not been educated in even the first principles of cleanliness. The difference between the conduct of an ordinary milk-farm and that of an operating-room in a good hospital is quite as marked as the difference between the cleanliness observed in an

operating-room in a good hospital at the present time and the operating-room of twenty-five years ago. Upon the cleanliness of our milk supply throughout the country depends the lives of thousands upon thousands of children. Why should not the conduct of milk farming and milk distribution be carried on with the same care as is exercised in the twentieth-century operating-room? If there is a career for the trained nurse in the hospital, why is there not a career for her as a milk-farmer?

But if the source of the milk supply is so dirty, why not feed condensed milk? Have you ever thought that if the source of the ordinary milk supply—because it must be kept sweet in order to be sold—is as it has been described, what the conditions are under which the milk is found that is collected to be condensed? Is it to be supposed for a moment that the men who collect milk to be condensed exercise even the same small care in collecting that milk that the milkman exercises in collecting the milk to be sold from a wagon or store? If milk is dirty, neither Pasteurizing, sterilizing, nor condensing will remove all of the dangerous sources of contamination. Such milk, while it may not contain living germs, still contains their dead and disintegrated bodies, together with certain poisons, toxines and ptomaines, excretions of the dead micro-organisms that have been killed by heat and which bear the same relation to the dead bacterial bodies that urine, feces, and sweat bear to our bodies. Putting the facts in another way, it is as if the reservoirs from which our water supplies are drawn had myriads of dead bodies floated through them, and then to purify the water it was to be sterilized by heat. Such a process would minimize and in some measure destroy the deleterious substances in the water, but who would care to drink the water, or recommend it as a good water supply for little children? What has been said of condensed milk may be repeated for the milk collected to go into the so-called milk foods. Again, milk treated by heat up to the Pasteurizing or boiling point has its constitution changed—its curd made tougher and more difficult of digestion, especially for little children.

It is mainly for the above reasons that the natural feeding of children should be insisted upon. Failing in this, a more careful, systematic inspection of all city milk supplies should be thoroughly carried out under municipal, State, and national inspectors, so that the mother compelled to use such milk, either through lack of education or failure of the maternal milk supply, should be enabled to get a milk having not only its proper food value, but an absence of excessive amounts of cow-manure and other dirt.

How may this be done? In most cities the municipal milk inspec-

tion of to-day provides for a standard of food value in the milk supplied to the people. In some of the smaller cities there is also an endeavor to provide for the inspection of the home and nearby sources of milk supply; but when, in a city like ours, milk comes from even sixty-miles' distance, the difficulties attending inspections by the city inspectors are at once manifest. When, as in New York City, the milk supply comes from some five other States, the difficulties attending the inspection of milk at the source of its supply by the municipality are insurmountable.

In our own city the most we can do to prevent dirty milk is to place a standard of cleanliness upon the milk coming into the city and to inspect the outlying dairies within driving or easy railroad distances. We attempt a standard of cleanliness by counting the bacteria in from three hundred to five hundred samples of milk each year. In practice it is almost impossible to get milk absolutely free from bacteria. Milk well cooled, containing less than one hundred thousand bacteria per cubic centimetre at the time of its collection, is considered good milk. This standard we have tried to insist upon for our city during the past four years.

In the large cities grocery milk and milk from dirty dairies contains from five million to one hundred million bacteria per cubic centimetre. In our city our attempt to maintain a standard of cleanliness has resulted as follows: Prior to 1900, eighty-six samples of milk showed an average of eight hundred and thirty-seven thousand bacteria per cubic centimetre, excluding twenty-six per cent. which contained over five million bacteria per cubic centimetre. In 1900, three hundred and nineteen samples of milk averaged seven hundred and ninety-six thousand bacteria per cubic centimetre, ten per cent. contained over five million bacteria per cubic centimetre, and fifteen per cent. contained under one hundred thousand bacteria per cubic centimetre. In 1901, two hundred and eighty-seven samples averaged two hundred and seventy-five thousand bacteria per cubic centimetre, nine per cent. contained over five million bacteria per cubic centimetre, and twenty-eight per cent. contained under one hundred thousand bacteria per cubic centimetre. In 1902, five hundred and thirty-one samples averaged two hundred and fifteen thousand bacteria per cubic centimetre, six per cent. contained over five million bacteria per cubic centimetre, and thirty-four per cent. under one hundred thousand bacteria per cubic centimetre.

In connection with these examinations more than four thousand samples were examined to determine the food value of milk. Stables and dairies within easy driving distance are frequently inspected and directions given for the order and maintenance of such places.

But of all this work the public is mainly ignorant, as it mainly is of the necessity for feeding clean milk to little children. The public, therefore, needs to be educated. This we attempted to do when in 1897 a municipal milk station was established in a most populous section of the city under the direction of Miss Annie E. Kennedy, then a pupil nurse of the Rochester City Hospital. The station was fitted out in a vacant store, where counters, shelving, refrigerators, hot and cold water, and all the necessary utensils for bottling milk for children's use were provided. Here in our ignorance we at first secured milk from a farmer whom we deemed reliable and subjected the milk to a Pasteurizing process. The milk was put up in nursing-bottles of various sizes and in various dilutions and sold to mothers at the cost of the milk, the bottles selling at from one-half cent to one cent per bottle. The milk was so prepared and cooled that when the mother secured the milk the only thing necessary for her to do was to put a nipple over the bottle and feed her child. At the stations little books published in English, German, Italian, and Hebrew giving the salient features of infant feeding were distributed free of cost. The text of this book may be summed up in the following: **TO KEEP A BABY WELL:** (1) Give it pure air day and night; (2) give it no food but mother's milk, milk from the bottle, or food directed by the physician; (3) give the baby water; (4) be sure that it gets enough sleep—two naps during the day at least; (5) do not put too much clothing on it; (6) bathe it in a tub every day; (7) don't handle it, let it alone.

We sought at the station to teach the mother with a hand-fed child to feed her child according to weight and not according to age. Weight indicates the stomach capacity of the child. To this end the station was provided with a scale, and in the absence of directions from a physician, the nurse weighed the baby and prescribed a food formula for it according to its weight. At the station beds of cheese-cloth stuffed with excelsior were for sale at cost. Nipples, bottle brushes, and small tooth-brushes were also for sale at cost. With the little booklet for a guide, the nurse talked to the mother about the care and feeding of her child, and to this work much of the success of the first year was largely due. At the beginning of August of the same year another station was opened in charge of a nurse from St. Mary's Hospital. At the end of the season about eight thousand bottles of milk had been distributed, and, more than this, much-needed information had been given by the nurses to the mothers who came to the stations. At the close of the year it was found that two hundred fewer children had died than in the year before. The following year two other stations were opened in charge of nurses from the Homœopathic and Hahnemann Hospitals.

It is now six full years since the summer milk stations were first established. Each one is in charge of a trained nurse from one of the city hospitals. Three years ago we stopped Pasteurizing the milk. Instead of having the central station in the city, we now have a portable milk laboratory on a farm in the suburbs. Milk collected and prepared at this farm, under the supervision of Miss Kennedy, contained less than fourteen thousand bacteria per cubic centimetre, while city milk during the same period approximated two hundred and thirty-five thousand bacteria per cubic centimetre.

During the six years that this work has been carried on the mortality in infants under one year of age has fallen sixty-five per cent., and the mortality in infants between one and five years of age has fallen fifty-eight per cent., below the mortality for the six years prior to the time this work was begun. For the same period the mortality of infants under five years of age has fallen from twenty-eight per cent. of the total mortality from all causes to 19.8 per cent. of the total mortality from all causes. Putting the facts in still another way, from 1897 to 1902 there were one thousand six hundred and twelve fewer deaths in children under five years of age than in the period from 1892 to 1896.

Comparing the mortality of our city with nine other cities in the State, it is found that the percentage of mortality in children under five years of age for the six years from 1897 to 1902 is for these cities as follows: New York, thirty-seven per cent.; Brooklyn, 36.1 per cent.; Long Island City, 34.7 per cent.; Albany, 21.5 per cent.; Yonkers, 37.4 per cent.; Troy, 22.7 per cent.; Utica, 23.9 per cent.; Syracuse, 23.1 per cent.; Buffalo, 32.3 per cent.; Rochester, 19.8 per cent.

This work is not dependent upon the amount of milk sold; its success is largely due to an improved system of milk inspection, to a bacterial standard for the city milk supply, and to the work of the nurses in the summer milk stations established under the auspices of the Rochester Health Department. These stations are only conducted during the months of July and August. We need at least one station open the year around, for in the winter milk is at its dirtiest, and while children are not affected to the same extent by dirty milk in the winter as they are in the summer, yet dirty milk always has its influence upon the health of every patient to whom milk is given. Remember this: The next time the doctor says, "Put the patient on a milk diet," look at the milkman, his wagons, cans, utensils, ask him where he gets his milk, and if the outward appearances of the milkman and his outfit are not all that you think they ought to be, tell him so, and if he doesn't improve, seek another and a cleaner-looking man and wagon.



THE FARM



THE FARM LABORATORY



MY FAITHFUL HELPER



WASHING CANS AND BOTTLES